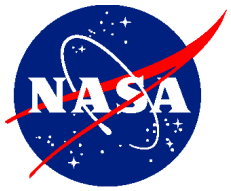

National Aeronautics and
Space Administration

NOT MEASUREMENT
SENSITIVE

NASA-STD-2805N
Effective September 7, 2010

MINIMUM HARDWARE CONFIGURATIONS

NASA TECHNICAL STANDARD

FOREWORD

This standard is approved for use by NASA Headquarters and all NASA Centers and is intended to provide a common framework for consistent practices across NASA programs.

The material covered in this standard is governed and approved by the NASA Information Technology Management Board. Its purpose is to define minimum hardware configurations necessary to support interoperability both between NASA end user computers and within the NASA operating environment. The standard establishes minimum “to keep” and minimum “to buy” hardware configurations. Adherence to this standard ensures compliance with federal requirements for desktop computers, laptops, and other end user devices.

Requests for information, corrections, or additions to this standard should be directed to the John H. Glenn Research Center at Lewis Field (GRC), Emerging Technology and Desktop Standards Group, MS 142-5, Cleveland, OH, 44135 or to *desktop-standards@lists.nasa.gov*. Requests for general information concerning standards should be sent to NASA Technical Standards Program Office, ED41, MSFC, AL, 35812 (telephone 256-544-2448). This and other NASA standard may be viewed and downloaded, free of charge, from the NASA Emerging Technology and Desktop Standards web page: http://etads.nasa.gov/current/2805.pdf .

(signature on file)

Linda Cureton
Chief Information Officer

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Contents

1 SCOPE

1.1 Purpose

This Standard defines the current minimum desktop hardware configuration that will be used by NASA to support interoperability. These specifications apply to all NASA desktop and portable systems that are required to support interoperability.

1.2 Scope

Desktop hardware below this minimum configuration may be used in areas where interoperability is not required. However, Agency workstations used for interoperability must meet the criteria specified in section 3.3 of this document.

1.3 Waivers

The waiver process set forth in NPR 2800.1, paragraph 2.2.4, applies to this standard. The desktop standards group, in cooperation with the Chief Technical Officer, will continue to process waivers on behalf of the Principal Center for Workgroup Hardware and Software.

2 ACRONYMS AND DEFINITIONS

2.1 Acronyms

CRT	Cathode Ray Tube
EPEAT	Electronic Product Environmental Assessment Tool
LCD	Liquid Crystal Display
ODIN	The Outsourcing Desktop Initiative for NASA

2.2 Definitions

2.2.1 Desktop Computer

The term desktop computer is used generically to refer to traditional desktop systems as well as laptop computers, notebooks, tablets, engineering workstations, and similar platforms that are utilized to provide basic interoperability.

2.2.2 Netbook Computer

An inexpensive, highly mobile, itinerant use computer to enable minimal mobile access to corporate data (web access, email and document viewing) on corporate devices, as an alternative to more expensive (fully featured, desktop-replacement level) laptops, or the use of personally owned equipment to supplement travel use.

2.2.3 Minimum Workstation to Support Basic Interoperability

Workstations that support basic interoperability are defined by being networked, and by having users who exchange information electronically, including those users that perform any or all of the activities encompassed in the minimum office automation software suite defined below.

2.2.4 Minimum “To Keep” Workstation Hardware Configuration

The minimum interoperable workstation hardware configuration that may be retained by a NASA organization.

2.2.5 Minimum “To Buy” Workstation Hardware Configuration

The minimum interoperable workstation hardware configuration that may be procured by a NASA organization. (The CIO at each Center is empowered and accountable for determining the performance/cost assessment for configurations that exceed the minimum hardware configuration and its associated cost. The Center CIO will also ensure that obsolete workstations are excessed on a one-for-one basis as new workstations are introduced.)

2.2.6 Minimum Interoperability Software Suite

The Minimum Interoperability Software Suite, is defined in NASA-STD-2804M, “*Minimum Interoperability Software Suite*.”

3 GENERAL REQUIREMENTS

3.1 Architectural Compliance Requirements

NASA maintains a baselined and approved Information Technology Architecture. The architecture is predicated on:

- The selection of standards for a broad and cost-effective infrastructure using commercial off-the-shelf and well-supported open source products to the greatest extent practical
- Interoperability both within and external to NASA
- Flexibility for future growth
- Consistency with generally accepted consensus standards as much as feasible
- Among these objectives, ensuring interoperability is one of NASA’s most critical issues related to information technology.

At times, it is in NASA’s best interest to specify commercial products as standards for an interoperable implementation of a particular set of related and integrated functions. The products themselves often include additional functionality or proprietary extensions not specified by this standard. While these products can be used to create higher-level interoperability solutions, these solutions may not be recognized within the context of the NASA interoperability environment and may be deprecated without warning by future revisions to this standard. Users of this standard are advised to apply appropriate caution when implementing proprietary or non-standard extensions, features and functions that go beyond the explicitly stated standard functionality.

3.2 Computing Platforms

This standard recognizes that NASA is a diverse agency with independent computing requirements. NASA will continue to support three desktop computing platforms: Windows, Macintosh, and Linux/UNIX.

3.3 Performance-Based Interoperability

The following tables establish the minimum desktop system hardware configurations that will support the agency-wide interoperability software suite as defined in NASA-STD-2804.

3.3.1 Minimum Hardware Requirements for PC and Macintosh systems

Minimum to Keep Hardware Requirements			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor:	Minimum Base Processor Frequency (x86)	1.0 GHz	Windows 7 Requirement
	Minimum Base Processor (Intel)		Mac OS X 10.6 Requirement
Memory (RAM):	512 MB[1]		Windows XP Requirement
Hard Drive Capacity:		10 GB[2]	
Graphics Technology:	32 Bit Color Support		
Display type	LCD		CRT displays shall be retired as of June 2013
Display Resolution:	1024x768 Pixels		MS Office 2007 Requirement
Optical Drive:	DVD+R: 16X DVD+RW: 8X DVD-R: 16X DVD-RW: 6X CD-R: 48X CD-RW: 32X		
Removable Storage	Encrypted		see 3.3.3 below
Sound:	Analog stereo output		
Speaker(s):			Internal
Interfaces:	USB		
Ports:	USB (Version/Quantity)	2.0/4	
	Serial	Quantity of One	
Slots:	PCI	Quantity of Two	
	PCI-E 1x	Quantity of One	
	PCI-E 16x	Quantity of One	
Network Interface:	10 Base-T Ethernet		
Smart Card Reader:	Required	NIST SP 800-96 Compliant	see 3.3.4 below
Energy Savings:		EPEAT Registered	see 3.3.5 below

[1] Note that Windows 7 requires a minimum of 1 GB RAM
[2] Note that Windows 7 requires a minimum of 16 GB

3.3.2 Minimum to Buy Configurations

The process for selecting hardware configurations is currently being re-evaluated. The next revision of this document will revise how hardware requirements are specified. Processor and clock speed alone are no longer the only criteria that are indicative of system performance.

Minimum Hardware Requirements for PC Desktop systems
This system is configured for general office automation use.

Minimum Hardware Requirements for PC Desktop			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	4 MB	The Intel® Core™ i5-660 Processor (4 MB Cache, 3.33 GHz) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	4	
	Minimum Base Processor Frequency	3.33 GHz	
	Processor Memory Controller	Integrated	
	Maximum Thermal Design Power	73 watts	
	Halogen Free	Required	
Memory (RAM):	4.0 GB	1066 MHz	
Hard Drive Capacity:	SATA Interface	500 GB, 7200 RPM	
Graphics Technology:		64 bit, 256 MB On-board RAM Supports Dual Display Configuration	
Display Size:	22" LCD		
Display Resolution:	1920x1200 Pixels		
Optical Drive:	16X DVD+/-RW	Internal	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Optical USB w/ Scroll		
Keyboard:	USB		
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	
Ports:	USB (Version/Quantity)	Version 2.0/ Quantity 4	
	Serial	Quantity of One	
Slots:	PCI	Quantity of Two	
	PCI-E 1x	Quantity of One	
	PCI-E 16x	Quantity of One	
Bluetooth	Revision 2.1 or higher		
Network Interface:	10/100/1000 Base-T Ethernet/802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant Integrated	
Energy Savings		EPEAT Gold Registered	

Minimum Hardware Requirements for Macintosh Desktop systems

This system is configured for general office automation use.

Minimum Hardware Requirements for Macintosh Desktop			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	4 MB	The Intel® Core™ i5-680 Processor (4M Cache, 3.60 GHz) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	4	
	Minimum Base Processor Frequency	3.60 GHz	
	Processor Memory Controller	Integrated	
	Maximum Thermal Design Power	73 Watts	
	Halogen Free	Required	
Memory (RAM):	4.0 GB	1333 MHz DDR3 SDRAM	
Hard Drive Capacity:	SATA Interface	1TB, 7200 RPM	
Graphics Technology:		64 bit, 256 MB On-Board RAM Supports Dual Display Configuration	Dual display requires optional Dual DVI adapter
Display Size:	27" LCD		
Display Resolution:	1920x1080 Pixels		
Optical Drive:	16X DVD+/-RW	Internal	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Optical USB w/ Scroll	Apple Magic Mouse	
Keyboard:	USB		
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	

Ports:	USB (Version/Quantity)	Version 2.0/Quantity 4	
	Firewire 800	Quantity of One	
	Mini Display Port Output w/ DVI Support	Quantity of One	
	Dual-Link DVI	Quantity of One	
	VGA Video	Quantity of One	
Slots:	SD Card Reader	Quantity of One	
Bluetooth	Revision 2.1 or higher		
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant External	
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for PC Laptop systems

This system is configured for users who use a laptop for their primary system who desire mobility.

Minimum Hardware Requirements for PC Laptop			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	3 MB	The Intel® Core™ i5-540M Processor (3 MB Cache, 2.53 GHz) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	4	
	Minimum Base Processor Frequency	2.53 GHz	
	Processor Memory Controller	Integrated	
	Maximum Thermal Design Power	35 watts	
	Halogen Free	Required	
Memory (RAM):	4.0 GB	1066 MHz	
Hard Drive Capacity:	SATA Interface	250 GB, 7200 RPM Includes Free Fall Sensor or Equivalent	
Graphics Technology:		64 bit, 256 MB On-Board RAM Supports Dual Display configuration with Docking Station	
Display Size:	WXGA+	15.4" Widescreen LCD	
Display Resolution:	1440x900 Pixels		
Optical Drive:	8X DVD+/-RW		
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Trackpoint Pad & Optical USB w/ Scroll		
Keyboard:		Integrated	
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	

Ports:	USB (Version/Quantity)	Version 2.0/Quantity 4	
	Firewire (1394)	Quantity of One	
Slots:	PCMCIA	Quantity of Two	
	SD/MMC Card Slot	Quantity of One	
	Locking Cable Slot	Quantity of One	
Bluetooth:	Revision 2.1 or higher	Integrated	
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant Integrated	
Webcam:	1.3 Megapixel (Built In)		
Microphone:		Integrated	
Weight:	5.5 lbs (Maximum)		
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for Mobile Engineering Workstation

This system is configured for the Engineering users who travel or telecommute.

System Component	Component Characteristics	Component Specification(s)	Comments
Processor	Minimum Cache Size	8 MB	The Intel® Core™ i7-820QM Processor (8M Cache, 1.73 GHz) can satisfy this requirement
	Minimum Core Count	4	
	Available Thread Count	8	
	Minimum Base Processor Frequency	1.73 GHz	
	Processor Memory Controller	Integrated	
	Maximum Thermal Design Power	45 watts	
	Halogen Free	Required	
Memory (RAM):	8.0 GB (2/4 banks populated)	1333 MHz DDR3	
Hard Drive Capacity:	Solid State	128 GB Capacity	
Graphics Technology:	Discrete Graphics Adaptor	64 bit, 1 GB Dedicated RAM Supports Dual Display configuration with Docking Station	
Display Size:	WXGA+	17" Widescreen LCD	
Display Resolution:	1920x1220 Pixels		
Optical Drive:	8X DVD+/-RW	Internal	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Trackpoint Pad & Optical USB w/ Scroll		
Keyboard:		Internal	
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	
Ports:	USB (Version/Quantity)	Version 2.0/Quantity 4	
	Firewire (1394)	Quantity of One	
Slots:	PCMCIA	Quantity of Two	
	SD/MMC Card Slot	Quantity of One	
	Locking Cable Slot	Quantity of One	
Bluetooth:	Revision 2.1 or higher	Integrated	
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:	NIST SP 800-96 Compliant	Integrated	
Webcam:	1.3 Megapixel (Built In)	Integrated	
Microphone:		Integrated	

Weight:	8.5 lbs		
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for Macintosh Laptop systems
This system is configured for users who use a laptop for their primary system who desire mobility.

Minimum Hardware Requirements for Macintosh Laptop			
System Component	**Component Characteristics**	**Component Specifications**	**Comments**
Processor	Minimum Cache Size	3 MB	The Intel® Core™ i5-540M Processor (3 MB Cache, 2.53 GHz) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	4	
	Minimum Base Processor Frequency	2.53 GHz	
	Processor Memory Controller	Integrated	
	Maximum Thermal Design Power	35 watts	
	Halogen Free	Required	
Memory (RAM):	4.0 GB	1066 MHz	
Hard Drive Capacity:	SATA Interface	320 GB, 7200 RPM	
Graphics Technology:		64 bit, 256 MB On-Board RAM Supports Dual Display configuration	
Display Size:		15.4" Widescreen LCD LED-backlit glossy widescreen	
Display Resolution:	1440x900 Pixels		
Optical Drive:	8X DVD+/-RW	Internal	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Trackpoint Pad & Optical USB w/ Scroll		
Keyboard:		Integrated	
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	

Ports:	USB (Version/Quantity)	Version 2.0/Quantity 2	
	Mini Display Port	Quantity of One	
	MagSafe Power Port	Quantity of One	
	Audio Line In	Quantity of One	
	Audio Line Out	Quantity of One	
	FireWire 800	Quantity of One	
Slots:	Locking Cable Slot	Quantity of One	
	SD Card Reader	Quantity of One	
Bluetooth:	Revision 2.1 or higher	Integrated	
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant External	
Webcam:	1.3 Megapixel (Built In)		
Microphone:		Integrated	
Weight:	5.6 lbs (Maximum)		
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for PC Lightweight Laptop systems
This system is configured for the user who users who travel often and would like a lighter system.

Minimum Hardware Requirements for PC Lightweight Laptop			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	6 MB	The Intel® Core™2 Duo Processor T9550 (6 MB Cache, 2.66 GHz, 1066 MHz FSB) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	2	
	Minimum Base Processor Frequency	2.66 GHz	
	Processor Memory Controller	1066 MHz FSB	
	Maximum Thermal Design Power	35 watts	
	Halogen Free	Required	
Memory (RAM):	4.0 GB	800 MHz	
Hard Drive Capacity:	SATA Interface	250 GB, 7200 RPM Includes Free Fall Sensor or Equivalent	
Graphics Technology:		64 bit, 256 MB On-Board RAM Supports Dual Display configuration with Docking Station	
Display Size:	WXGA+	14.1" Widescreen LCD	
Display Resolution:	1440x900 Pixels		
Optical Drive:	8X DVD+/-RW		
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Trackpoint Pad & Optical USB w/ Scroll		
Keyboard:		Integrated	
Sound:	Analog stereo output		
Speaker(s):		Integrated	

Headphones:		Required	
Ports:	USB (Version/Quantity)	Version 2.0/Quantity 4	
	Firewire (1394)	Quantity of One	
Slots:	PCMCIA	Quantity of Two	
	SD/MMC Card Slot	Quantity of One	
	Locking Cable Slot	Quantity of One	
Bluetooth:	Revision 2.1 or higher	Integrated	
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant Integrated	
Webcam:	1.3 Megapixel (Built In)		
Microphone:		Integrated	
Weight:	4.3 lbs (Maximum)		
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for Macintosh Lightweight Laptop systems
This system is configured for user who travel often and would like a lighter system.

Minimum Hardware Requirements for Macintosh Lightweight Laptop			
System Component	**Component Characteristics**	**Component Specifications**	**Comments**
Processor	Minimum Cache Size	3 MB	The Intel® Core™2 Duo Processor P8800 (3 MB Cache, 2.66 GHz, 1066 MHz FSB) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	2	
	Minimum Base Processor Frequency	2.66 GHz	
	Processor Memory Controller	1066 MHz FSB	
	Maximum Thermal Design Power	35 watts	
	Halogen Free	Required	
Memory (RAM):	4.0 GB	1066 MHz	
Hard Drive Capacity:	SATA Interface	320 GB, 5400 RPM	
Graphics Technology:		64 bit, 256 MB On-Board RAM	
Display Size:		13.3" Widescreen LCD LED-backlit glossy widescreen	
Display Resolution:	1280x800 Pixels		
Optical Drive:	8X DVD+/-RW	Internal	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Trackpoint Pad & Optical USB w/ Scroll		
Keyboard:		Integrated	
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	

Ports:	USB (Version/Quantity)	Version 2.0/Quantity 2	
	Mini Display Port	Quantity of One	
	MagSafe Power Port	Quantity of One	
	Audio Line In	Quantity of One	
	Audio Line Out	Quantity of One	
	FireWire 800 Port	Quantity of One	
Slots:	Locking Cable Slot	Quantity of One	
	SD Card Slot	Quantity of One	
Bluetooth:	Revision 2.1 or higher	Integrated	
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant External	
Webcam:	1.3 Megapixel (Built In)		
Microphone:		Integrated	
Weight:	4.5 lbs (Maximum)		
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for PC Ultra Lightweight Laptop systems
This system is configured for the user who travel extensively and are willing to give up functionality for a lighter system.

Minimum Hardware Requirements for PC Ultra Lightweight Laptop			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	6 MB	The Intel® Core™2 Duo Processor T9550 (6 MB Cache, 2.66 GHz, 1066 MHz FSB) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	2	
	Minimum Base Processor Frequency	2.66 GHz	
	Processor Memory Controller	1066 MHz FSB	
	Maximum Thermal Design Power	35 watts	
	Halogen Free	Required	
Memory (RAM):	4.0 GB	800mhz	
Hard Drive Capacity:	SATA Interface	250 GB, 7200 RPM Includes Free Fall Sensor or Equivalent	
Graphics Technology:		Integrated	
Display Size:	WXGA+	13.3" Widescreen LCD	
Display Resolution:	1280x800 Pixels		
Optical Drive:	8X DVD+/-RW	External	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Trackpoint Pad & Optical USB w/ Scroll		
Keyboard:		Integrated	
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	

Ports:	USB (Version/Quantity)	Version 2.0/Quantity 2	
	Firewire (1394)	Quantity of One	
Slots:	ExpressCard 34/54	Quantity of One	
	SD/MMC Card Slot	Quantity of One	
	Locking Cable Slot	Quantity of One	
Bluetooth:	Revision 2.1 or higher	Integrated	
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant Integrated	
Webcam:	1.3 Megapixel		Optional
Microphone:		Integrated	
Weight:	3.5 lbs		
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for Macintosh Ultra Lightweight Laptop systems
This system is configured for the user who travel extensively and are willing to give up functionality for a lighter system.

Minimum Hardware Requirements for Macintosh Ultra Lightweight Laptop			
System Component	**Component Characteristics**	**Component Specifications**	**Comments**
Processor	Minimum Cache Size	6 MB	The Intel® Core™2 Duo Processor SL9400 (6 MB Cache, 1.86 GHz, 1066 MHz FSB) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	2	
	Minimum Base Processor Frequency	1.86 GHz	
	Processor Memory Controller	1066 MHz FSB	
	Maximum Thermal Design Power	17 watts	
	Halogen Free	Required	
Memory (RAM):	2.0 GB	1066 MHz	
Hard Drive Capacity:	-Solid State	128 GB	
Graphics Technology:		64 bit, 256 MB On-Board RAM	
Display Size:		13.3" Widescreen LCD LED-backlit glossy widescreen	
Display Resolution:	1280x800 Pixels		
Optical Drive:	8x SuperDrive	External (DVD±R DL/DVD±RW/CD-RW)	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Trackpoint Pad & Optical USB w/ Scroll		
Keyboard:		Integrated	
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	

Ports:	USB (Version/Quantity)	Version 2.0/Quantity1	
	Mini Display Port	Quantity of One	
	MagSafe Power Port	Quantity of One	
	Audio Line Out	Quantity of One	
Bluetooth:	Revision 2.1 or higher	Integrated	
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant	External
Microphone:		Integrated	
Weight:	3.0 lbs		
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for PC Workstation systems

Minimum Hardware Requirements for PC Workstation			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	12 MB	The Intel® Core™ i7-980X Processor Extreme Edition (12 MB Cache, 3.33 GHz, 6.40 GT/s Intel® QPI) can satisfy this requirement
	Minimum Core Count	6	
	Available Thread Count	12	
	Minimum Base Processor Frequency	3.33 GHz	
	Processor Memory Controller	Integrated	
	Maximum Thermal Design Power	130 watts	
	Halogen Free	Required	
Memory (RAM):	16.0 GB	1066 MHz	
Hard Drive Capacity:	SATA Interface	2x640 GB, 7200 RPM	
Graphics Technology:	Dual DVI	128 bit, 768MB On-Board RAM Supports Dual Display configuration	
Display Size:	24" LCD		
Display Resolution:	1920x1200 Pixels		
Optical Drive:	16X DVD+/-RW	Internal	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Optical USB w/ Scroll		
Keyboard:	USB		
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	
Ports:	USB (Version/Quantity)	Version 2.0/Quantity 5	
	Serial	Quantity of One	

Slots:	PCI	Quantity of Two	
	PCI-E 1x	Quantity of Two	
	PCI-E 16x	Quantity of One	
Bluetooth	Revision 2.1 or higher		
Network Interface:	10/100/1000 Base-T Ethernet		
Smart Card Reader:		NIST SP 800-96 Compliant Integrated	
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for Macintosh Workstation systems

Minimum Hardware Requirements for Macintosh Workstation			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	8 MB	Two Intel Xeon 5500 Series processors at 2.66 GHz can satisfy this requirement
	Minimum Core Count	8 (Two Quad Core)	
	Available Thread Count	16	
	Minimum Base Processor Frequency	2.66 GHz	
	Processor Memory Controller	1333 MHz FSB	
	Maximum Thermal Design Power	95 Watts	
	Halogen Free	Required	
Memory (RAM):	16.0 GB	1066mhz	
Hard Drive Capacity:	SATA Interface	2x640 GB, 7200 RPM	
Graphics Technology:		128bit, 768MB On-Board RAM Dual Display Configuration	
Display Size:	24" LCD		
Display Resolution:	1920x1200 Pixels		
Optical Drive:	18x	Integrated VD±R DL/DVD±RW/CD-RW	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Optical USB w/ Scroll	Apple Magic Mouse	
Keyboard:	USB		
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	

Ports:	USB (Version/Quantity)	2.0/4	
	Firewire 800	Quantity of One	
	Mini Display Port Output w/ DVI Support	Quantity of One	
	Dual-Link DVI	Quantity of One	
	VGA Video	Quantity of One	
Slots:	PCI Express	Quantity of Three	
	PCI Express 2.0 4x	Quantity of Two	
	PCI Express 2.0 16x	Quantity of One	
Bluetooth	Revision 2.1 or higher		
Network Interface:	10/100/1000 Base-T Ethernet/ 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant External	
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for PC Tablet systems

Minimum Hardware Requirements for PC Tablet			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	4 MB	The Intel® Core™2 Duo Processor SU9400 (3M Cache, 1.40 GHz, 800 MHz, FSB) can satisfy this requirement
	Minimum Core Count	2	
	Available Thread Count	2	
	Minimum Base Processor Frequency	1.4 GHz	
	Processor Memory Controller	800 MHz FSB	
	Maximum Thermal Design Power	1.4 watts	
	Halogen Free	Required	
Memory (RAM):	3.0 GB	1066 MHz	
Hard Drive Capacity:	SATA Interface	120 GB, 5400 RPM	
Graphics Technology:		Integrated	
Display Size:	12.1 WXGA LCD Widescreen	Touch Capacitive	
Display Resolution:	1280x800 Pixels		
Optical Drive:	4X DVD+/-RW	External	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Stylus, Trackpoint pad and Optical USB w/ Scroll		
Keyboard:		Integrated	
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	
Ports:	Firewire (1394)	Quantity of One	
	USB (Version/Quantity)	Version 2.0/Quantity 2	
Slots:	PCMCIA or Express Card 34/54	Quantity of One	

Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant Integrated	
Bluetooth:	Revision 2.1 or higher	Integrated	
WebCam:	1.3 Megapixel		Optional
Microphone:		Integrated	
Weight:	4.5 lbs		
Energy Savings:		EPEAT Gold Registered	

Minimum Hardware Requirements for Netbook systems

This system is configured for the user who needs an itinerant use computer to enable minimal mobile access to corporate data (web access, email and document viewing).

Minimum Hardware Requirements for Netbook			
System Component	**Component Characteristics**	**Component Specification(s)**	**Comments**
Processor	Minimum Cache Size	512 KB	The Intel® Atom™ N270 (1.60 GHz, 512KB L2 Cache, 533MHz FSB) can satisfy this requirement
	Minimum Core Count	1	
	Available Thread Count	2	
	Minimum Base Processor Frequency	1.4 GHz	
	Processor Memory Controller	800 MHz FSB	
	Maximum Thermal Design Power	2.5 watts	
	Halogen Free	Required	
Memory (RAM):	1.0 GB	800 MHz	
Hard Drive Capacity:		250 GB, 5400 RPM	
Graphics Technology:		Integrated	
Display Size:	10.1" WSVGA	LED Display	
Display Resolution:	1024x576 Pixels		
Optical Drive:	8X DVD+/-RW	External	
Removable Media:	Encrypted USB 2.0 Memory Stick	2.0 GB, FIPS 140-2 Validated	
Mouse:	Stylus, Trackpoint pad and Optical USB w/ Scroll		
Keyboard:		Integrated	
Sound:	Analog stereo output		
Speaker(s):		Internal	
Headphones:		Required	
Ports:	USB (Version/Quantity)	Version 2.0/Quantity 2	

Slots	Cable Locking Slot	Quantity of One	
	SD Card or Express Card 54	Quantity of One	
Network Interface:	10/100/1000 Base-T Ethernet / 802.11n		
Smart Card Reader:		NIST SP 800-96 Compliant External	
Bluetooth:	Revision 2.1 or higher	Integrated	
WebCam:			Optional
Microphone:		Integrated	
Weight:	3.0 lbs		
Energy Savings:		EPEAT Gold Registered	

3.3.3 Minimum Mobile Device Requirements

- Native Support for Microsoft Exchange
- Centralized management via Microsoft Exchange ActiveSync Policies with specific support for remote wipe capability, password locking, and wipe after predetermined number of bad password attempts.
- Device encryption is required
- Corporate cellular phone licensing and billing agreements.

3.3.4 Removable Storage

Systems procured after this standard's effective date must include a small USB-based removable encryption storage device of not less than 2 GB capacity. This storage device must be FIPS 140-2 validated.

3.3.5 Smart Card Reader

All systems (not just newly procured ones) must include, a smart card reader that meets the requirements of NIST SP 800-96, and appears on the GSA's FIPS 201 Approved Product List, found at http://fips201ep.cio.gov/apl.php. Additionally, the NASA Desktop Smartcard Integration Project validates smartcard readers of various interface types for use on NASA Desktops. Additional information on supported smartcard reader devices on specific platforms is provided on the Desktop Smartcard Integration site as it become available. See http://etads.nasa.gov/DSI/ for current detailed information.

NASA OCIO will provide SCM Microsystems SCR331 USB-attached readers. These readers, when used with appropriate driver software, meet NASA's requirements. The reader hardware will be made available to the Centers at no additional cost, and should be deployed as the Center infrastructure is available to support smart card use on desktops. In addition, the HSPD12 Desktop Integration Project is validating smart card readers of various interface types for use on NASA Desktops. Additional details about the HSPD12 compliance schedule, supported smart card reader devices on specific platforms will be provided as they become available. See http://etads.nasa.gov/DSI/ for current information.

3.3.6 Energy Saving

Newly procured systems must be EPEAT-Gold. See http://www.epeat.net for the list of registered systems.

EPEAT evaluates electronic products in relation to 51 total environmental criteria, identified in the Criteria Table below and contained in IEEE 1680 -– 23 required criteria and 28 optional criteria. To qualify for registration as an EPEAT product, the product must conform to all the required criteria.
Products are also ranked in EPEAT according to three tiers of environmental performance Bronze, Silver, and Gold. All registered products must meet the required criteria, and achieve Bronze status. Manufacturers may then achieve a higher level EPEAT "rating" for products by meeting additional optional criteria, as follows:

EPEAT Criteria Table

Bronze	Silver	Gold
		
Meets all 23 required criteria	Meets all 23 required criteria plus at least 50% of the optional criteria	Meets all 23 required criteria plus at least 75% of the optional criteria

The IEEE 1680 Standard, which forms the basis of EPEAT, requires that every EPEAT registered product meet the current version of the applicable ENERGY STAR standard..

Please refer to NASA-STD-2804 for requirements on how energy-saving features should be configured.

3.4 Section 508 Compliance Requirements

Hardware products procured after June 21, 2001 must be in conformance with Section 508 of the Rehabilitation Act. Complete information and guidance on addressing Section 508 requirements is available at:

http://www.section508.nasa.gov

4 REVIEW AND REPORTING REQUIREMENTS

4.1 Interoperability Reporting

Each Center CIO will establish the necessary processes and tools, both manual and automated, to report on an annual basis to the NASA CIO the hardware and software configuration of all workstations at their respective Centers. These data will contain sufficient information to ascertain if the workstation supports NASA employees or is Government-furnished equipment to a contractor, whether the equipment is required to be interoperable, and a description of the hardware architecture/environment. The report will specify the number of NASA employees that do not have access to interoperable workstations.

4.2 Basic Interoperability Standards Maintenance

This standard, and it's companion, NASA-STD-2804 Minimum Interoperability Software Suite, are maintained on behalf of the NASA CIO by the Emerging Technology and Desktop Standards group. Together, these standards define the software, hardware, and configurations necessary to ensure basic interoperability within the NASA information technology computing infrastructure.

This standard will be reviewed and updated on an as-required basis, not to exceed 12-month intervals. Participation in the revision process is open to all NASA employees. Details on how to be alerted of changes to the standards and/or comment on proposed updates can be found at:

http://etads.nasa.gov/DCS

This site also maintains interim guidance, position papers, software and hardware reviews, recommendations and other documentation intended to promote standardized basic interoperability.

5 DURATION

5.1 Duration

This standard will remain in effect until canceled or modified by the NASA CIO.

6 SUPPORTING DOCUMENTS

6.1 Supporting Documents

Supporting documents and additional information related to this standard may be found at:

http://etads.nasa.gov/DCS
http://etads.nasa.gov/DSI/
http://pki.nasa.gov/